

Kenworth SmartWheel Troubleshooting Guide

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Related Documents

Service Manuals

Kenworth SmartWheel Troubleshooting Guide, KM816010.

TIBs

15-16A T2000 Multiplex Steering Wheel Operation

15-17 SmartWheel / Multiplex Steering Wheel Controls

Wiring Diagrams

SmartWheel Multiplex Switch Module K301-415 01

Headlamps w/Multiplex (SmartWheel) Steering Wheel P94-1191 - 01

Horn Multiplex Steering Wheel R115-5453 01

Headlamps w/ Multiplex R115-5450 01

Headlamps w/ MUX Wheel P94-1335 01

Clearance & ID Lamps w/ Multiplex (SmartWheel) P94-1197 - 01

Clearance & ID Lamps, T800A Cabs w/Multiplex Steering Wheel R115-5452 01

Clearance & ID Lamps, BII Cabs w/Multiplex Steering Wheel R115-5451 01

Headlamps, w/ MUX Wheel P94-1380 01

Multiplex W/94 CAT R115-5456 A 01

Cummins Plus, MUX, Smartwheel R115-6017 01

T2000 DDEC III Engine Wiring P94-1009 A 01

DDEC III W/Multiplex R115-5457 A 01

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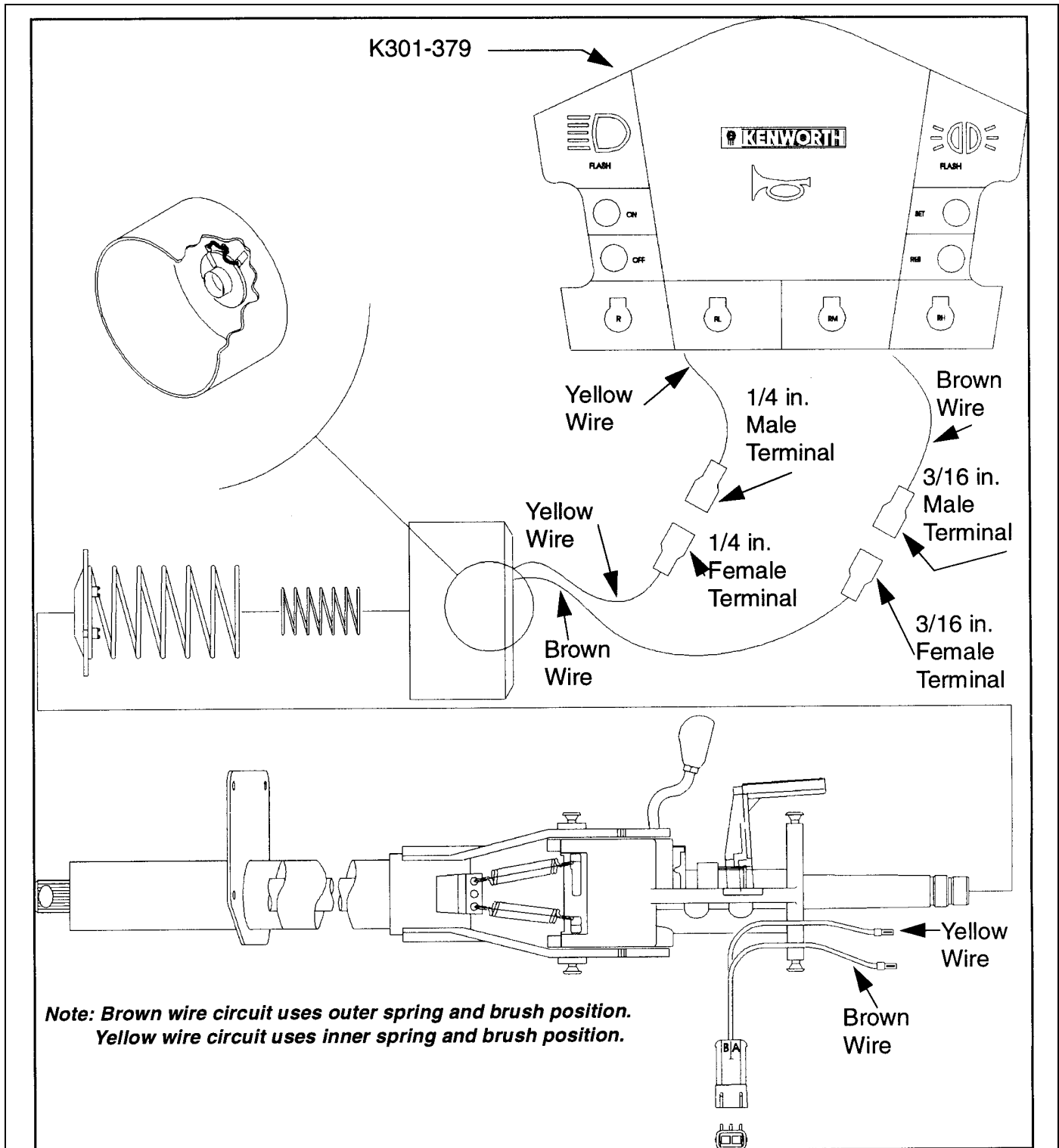


Figure 16-1

Kenworth SmartWheel Troubleshooting Guide**16****Purpose**

The purpose of this guide is to locate malfunctions in the

- wiring
- connectors
- power distribution box relays
- steering wheel hub
- multiplex electronics module
- slip rings

If the wiring, connectors, and relays are functioning properly, it is reasonable to assume that the malfunction is in the multiplex wheel system (hub, module, or slip rings).

IMPORTANT: Verify a malfunction in the SmartWheel steering wheel hub or the multiplex electronics module before replacing them. **The only way to check these components is with the Kenworth SmartWheel Multiplex Steering Wheel Tester.** Replacing these components will not correct the malfunction if the problem is due to open wires, poor connections, or bad relays.

CAUTION: Do not attempt to disassemble the electronics module or the steering wheel hub. Disassembly will void warranty.

How to use this Troubleshooting Guide

Check the multiplex wheel for proper operation according to the Kenworth Multiplex Steering Wheel Operating Manual.

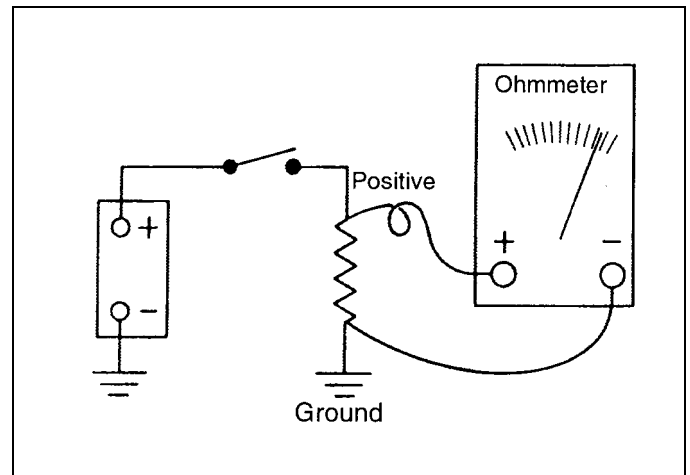
If **none** of the functions on the steering wheel work or they work erratically, go to Section A, Start.

If **some** of the functions on the steering wheel work, go to the Section for the function that doesn't work.

Tools for Troubleshooting

- Kenworth SmartWheel Multiplex Steering Wheel Tester (strongly recommended). - Volt-ohmmeter rated at 20,000 ohms per volt. For proper connections, see Figure 16-2.
- Wiring diagrams. See Appendix of this manual.
- Operating Manual for Kenworth SmartWheel Multiplex Control System.

NOTE: Excellent basic troubleshooting procedures are described in the Kenworth Electrical Troubleshooting Manual. This manual is useful if you are unfamiliar with how to use an ohmmeter or need suggestions for electrical troubleshooting techniques.

**Figure 16-2**

CAUTION: Before connecting an ohmmeter to a circuit, disconnect the power source. Then verify that the circuit is without voltage by connecting a voltmeter to the circuit. Ohmmeter may be damaged if connected to a voltage source.

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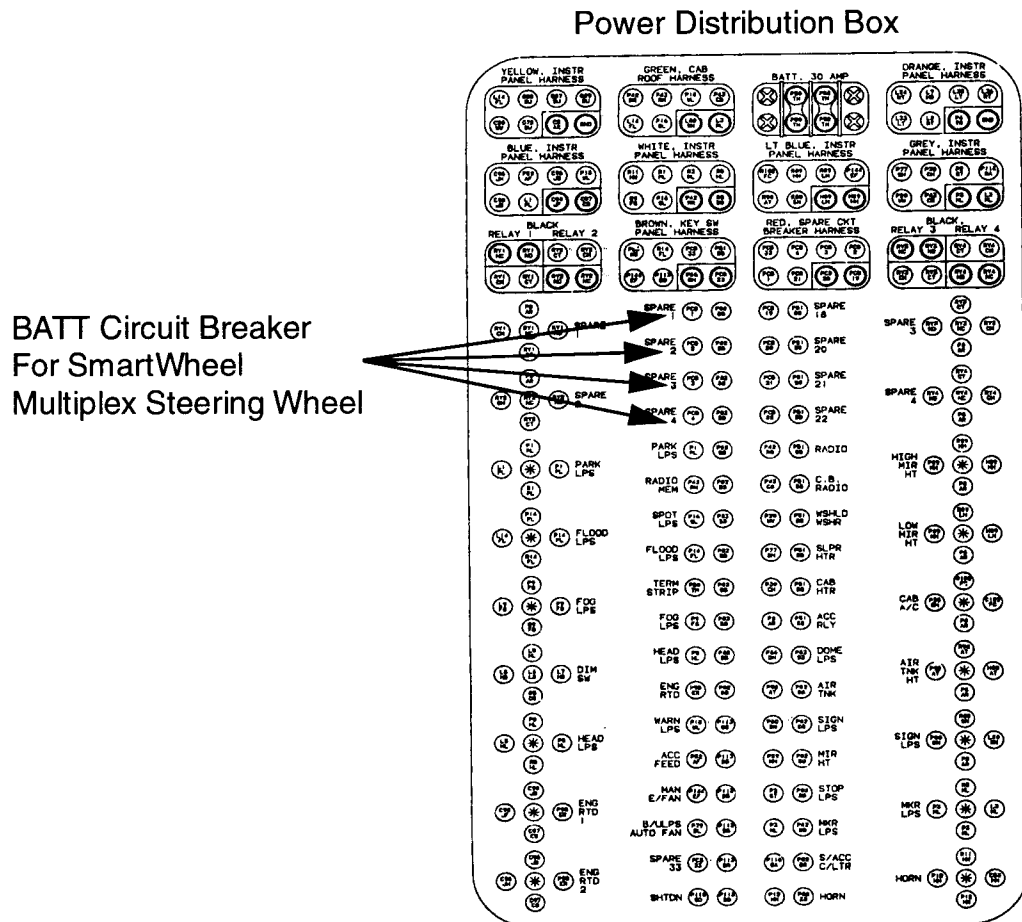
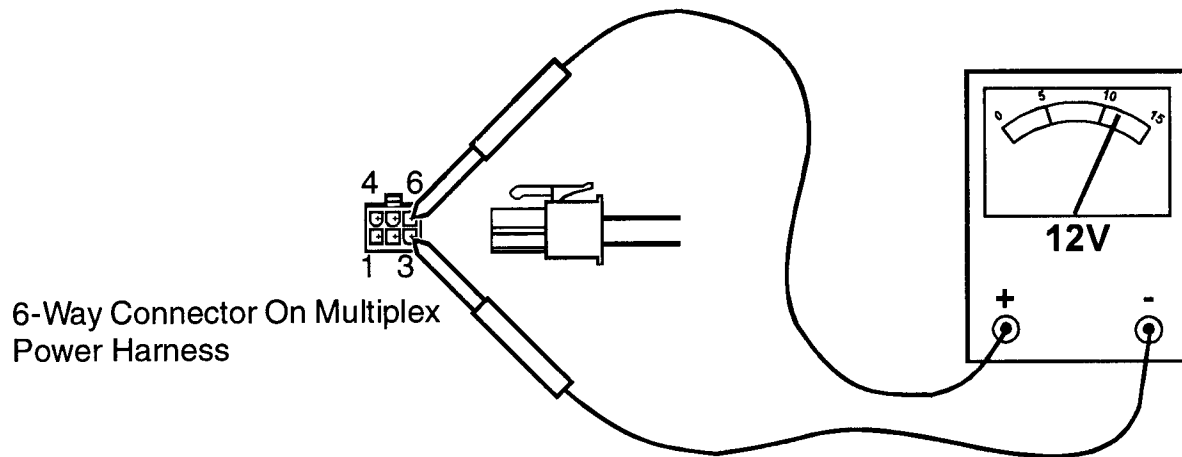


Figure 16-3

Kenworth SmartWheel Troubleshooting Guide**16****Troubleshooting Charts****A. Start - No Functions Work or Operation is Intermittent**

A1. Possible cause: Open circuit in BA11 or Gnd circuit to elect. module (circuits PCB 1, 2, 3, or 4 and G N D).

Check	Result	What To Do Next
A1-1 Unplug the 6-way connector from the multiplex electronics module. Check voltage between pin 6 and pin 3.	Voltmeter reads battery voltage. No voltage.	Go to A1-2 . Go to A1-3 .
A1-2 Check connector pins to make sure they are not corroded, bent, or unseated.	Connector pins OK. Connector pins bad.	Go to A1-4 . Repair or replace connector/ pins. If problem is corrosion, eliminate source of moisture.
A1-3 Check circuit breaker or fuse in power distribution box position Spare 1,2,3, or 4.	Circuit breaker good. Circuit breaker bad.	There is a broken wire or connector in the harness or in the power distribution box. Look at the multiplex steering wheel headlamp wiring diagram and trouble-shoot circuit PCB 1,2,3, or 4 and GND. Replace circuit breaker.
A1-4 Visually check the 2-way connector just behind the steering column in the dash (twisted pair circuit from steering wheel).	Connector OK. Connector unplugged, broken, corroded.	Go to A2 . Repair/Replace connector. If problem is corrosion, eliminate source of moisture.

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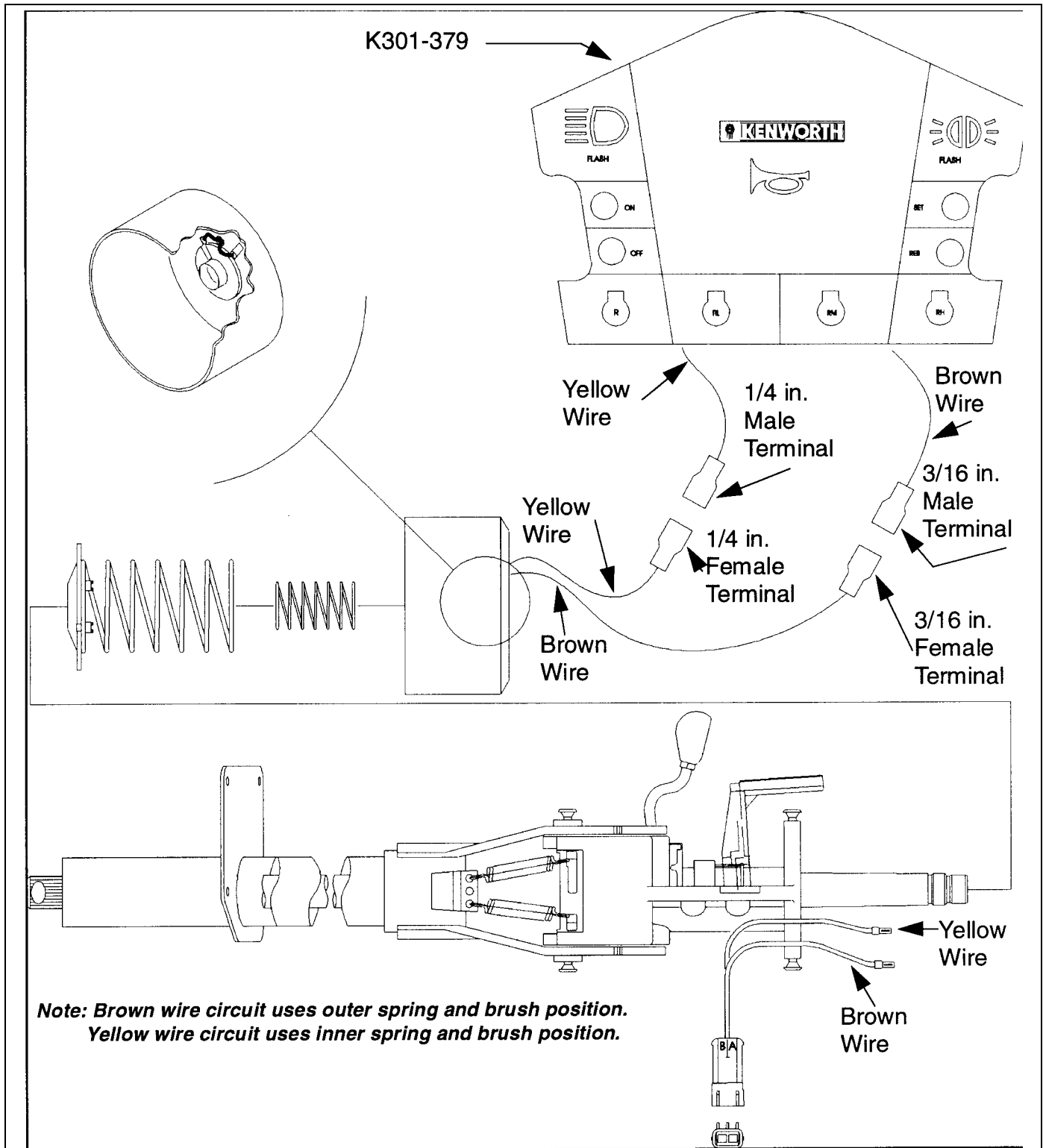


Figure 16-4

Kenworth SmartWheel Troubleshooting Guide**16****A. Start - No Functions Work Or Operation is Intermittent****A2. Possible cause: Bad electrical connection to hub or slip rings.**

Check	Result	What To Do Next
A2-1 Remove 4 screws holding hub to steering wheel and check wire connections to hub.	Wires/connections OK. Wires or connectors disconnected, broken, corroded.	Go to A2-2 . Repair/replace terminals or wires. Be careful to observe polarity on wires.
A2-2 Check continuity of ckts IPX SIG and IPX GND through brushes and slip rings (yellow and brown wires). Measure from hub to 2 way metri-pack connector at base of steering column and from 2 way connector to 6 way connector (pins 1 and 2) at multiplex module. Also check polarity of circuits. If reversed, no functions will work and module may be damaged.	Each circuit has continuity. No continuity in one or both circuits. Continuity is intermittent in one or both circuits as steering wheel is turned.	Go to A3-1 . Go to A2-3 . Go to A2-4 .
A2-3 Extend steering column to full telescoped position. Remove side covers from steering column and inspect slip rings, brushes & contact springs. Turn steering wheel while observing brush and slip ring operation.	Brushes not contacting slip rings. Wires not making good connection to brushes. Inner and/or outer springs not making contact to slip rings or to contacts under gap hider cover.	Adjust, repair or replace affected parts Replace brushes. Adjust, repair or replace affected parts.

MULTIPLEX WHEEL TESTER

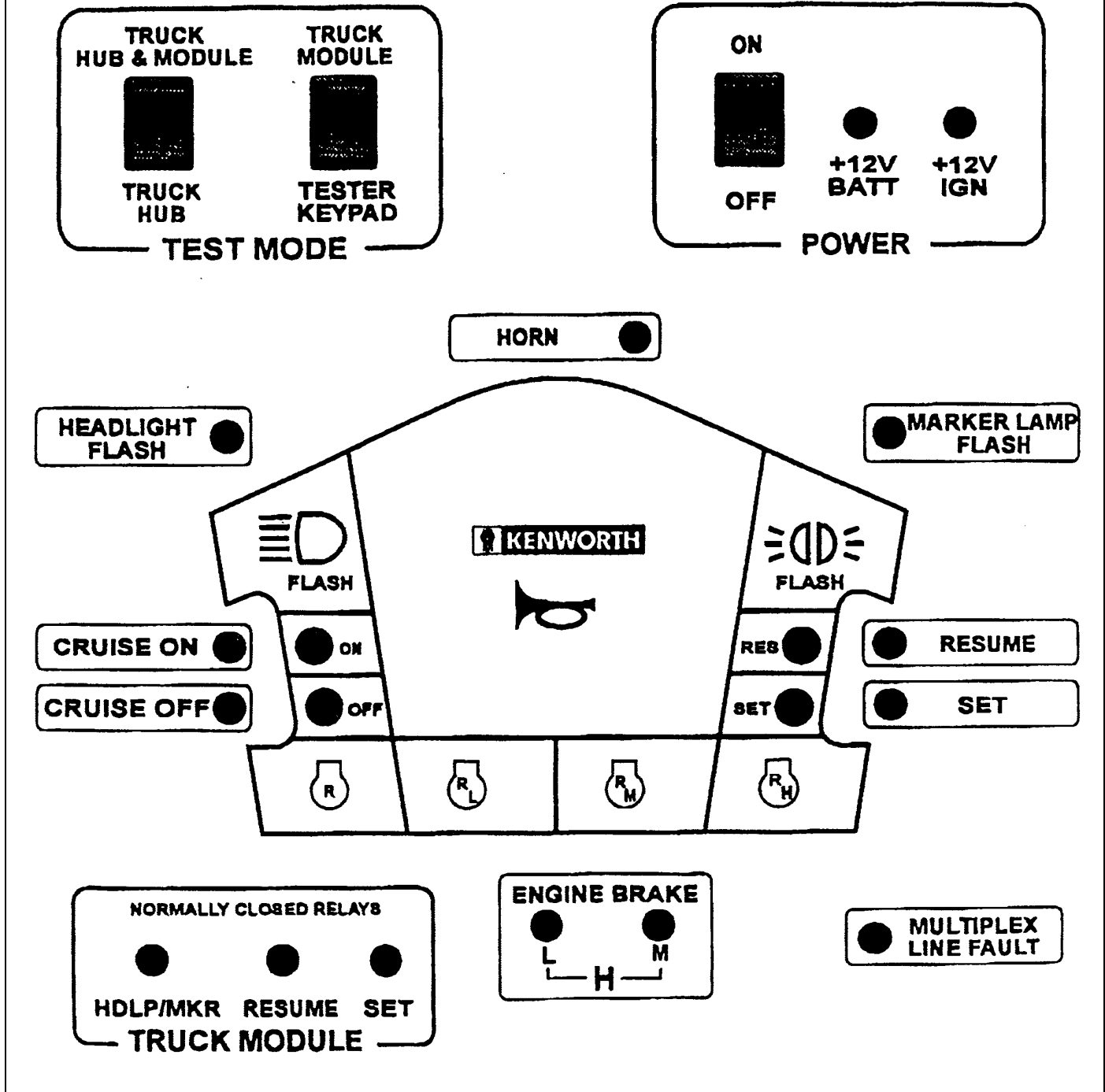


Figure 16-5

Kenworth SmartWheel Troubleshooting Guide**16****A. Start - No Functions Work Or Operation is Intermittent****A2. Possible cause: Bad electrical connection to hub or slip rings.**

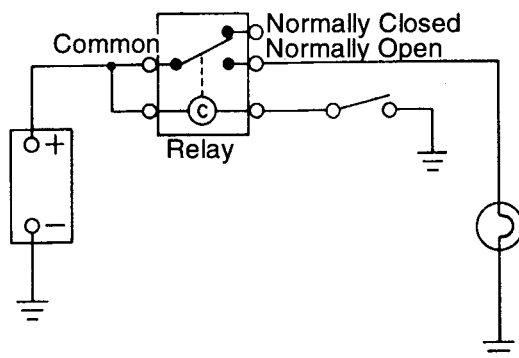
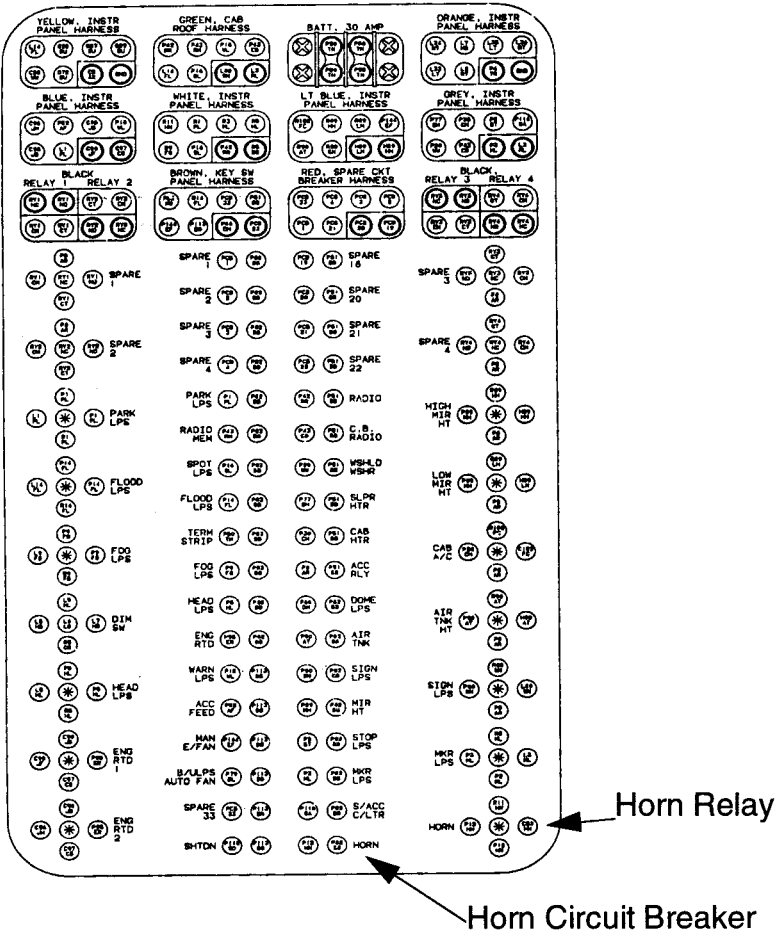
Check	Result	What To Do Next
A2-4 Check condition of lubrication on contact surfaces of dual brass slip ring.	No grease exists. Grease very thin (brass is dry in places).	Apply contact ring grease (available from DSM) according to prescribed method. <i>Use only this type of grease.</i>

A3. Possible cause: Bad electronics module or steering wheel hub.

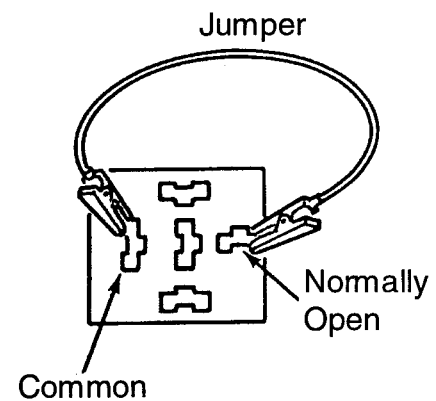
Check	Result	What To Do Next
A3-1 Connect the multiplex steering wheel tester to the module and the truck harness. Follow the steps in the tester manual for testing the "Truck Module".	Module tests OK. Module fails test.	Go to A3-2. Replace module.
A3-2 Follow the steps in the tester manual for testing the "Truck Hub".	Hub fails test.	Check all wiring and connections between module and steering wheel hub (ckts IPX SIG and IPX GND). If no problems are found, replace steering wheel hub.

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Typical Relay Circuit



Jumper Across Switch Portion Of Relay

Figure 16-6

Kenworth SmartWheel Troubleshooting Guide**16****B. Horn Does Not Work**

NOTE: Use this section only if horn does not work. If none of the SmartWheel functions work, go to Section A.

B1. Possible cause: No power or ground in horn circuit.

Check	Result	What To Do Next
B1 -1 Horn circuit breaker or fuse in cab power distribution box.	Circuit breaker or fuse OK. No continuity.	Go to B1-2 . Determine cause for fuse to blow (shorted wire, etc.). Replace circuit breaker or fuse. If horn still does not work, go to B1-2 .
B1 -2 Horn wiring/ connections leading to horn (ckt C53HN). Use multiplex steering wheel horn wiring diagram R115-5453.	Wires OK, connectors clean and tight. Wires broken, frayed, or connectors loose, damaged, corroded.	Go to B2 . Repair or replace wires and/or connectors.

B2. Possible cause: Bad horn relay in power distribution box.

Check	Result	What To Do Next
B2-1 Press horn button on steering wheel. Listen for relay click in power distribution box.	Click heard. No click heard.	Remove horn relay. Use jumper wire from terminal marked + to terminal directly across from it. Horn should come on. If horn works, replace relay. If horn does not work, it may be defective or problem exists in truck wiring. Troubleshoot ckt C53HN. Go to B3 .

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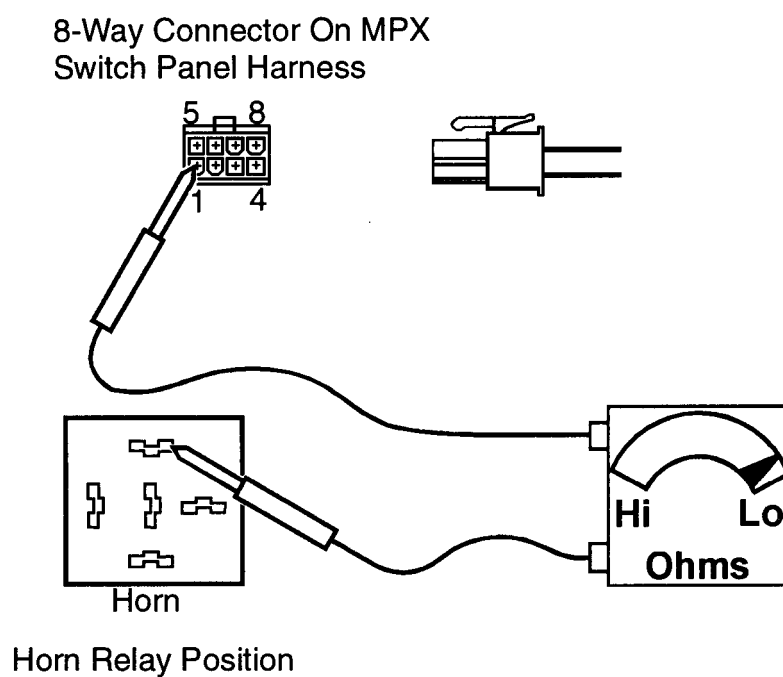


Figure 16-7

Kenworth SmartWheel Troubleshooting Guide**16****B. Horn Does Not Work****B3. Possible cause: Problem in circuit R11HN.**

Check	Result	What To Do Next
B3-1 Unplug the 8 way connector from the multiplex module. Check continuity of ckt R11 HN from pin 1 of the connector to terminal marked S at horn relay position in power distribution box.	Ckt has continuity. No continuity.	Go to B4 . There is a break in the circuit between the module and the power distribution box. Trace ckt R11 HN.

B4. Possible cause: Bad electronics module or steering wheel hub.

Check	Result	What To Do Next
B4-1 Plug 8 way connector back into module. Locate one way slide terminal in ckt R11 HN and disconnect. Check for continuity between R11 HN leading to module and ground when horn button is pressed.	Continuity to gnd when button pressed. No continuity.	Problem is in truck wiring. Recheck circuits R11 HN and C53HN. Go to A3 .

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Power Distribution Box

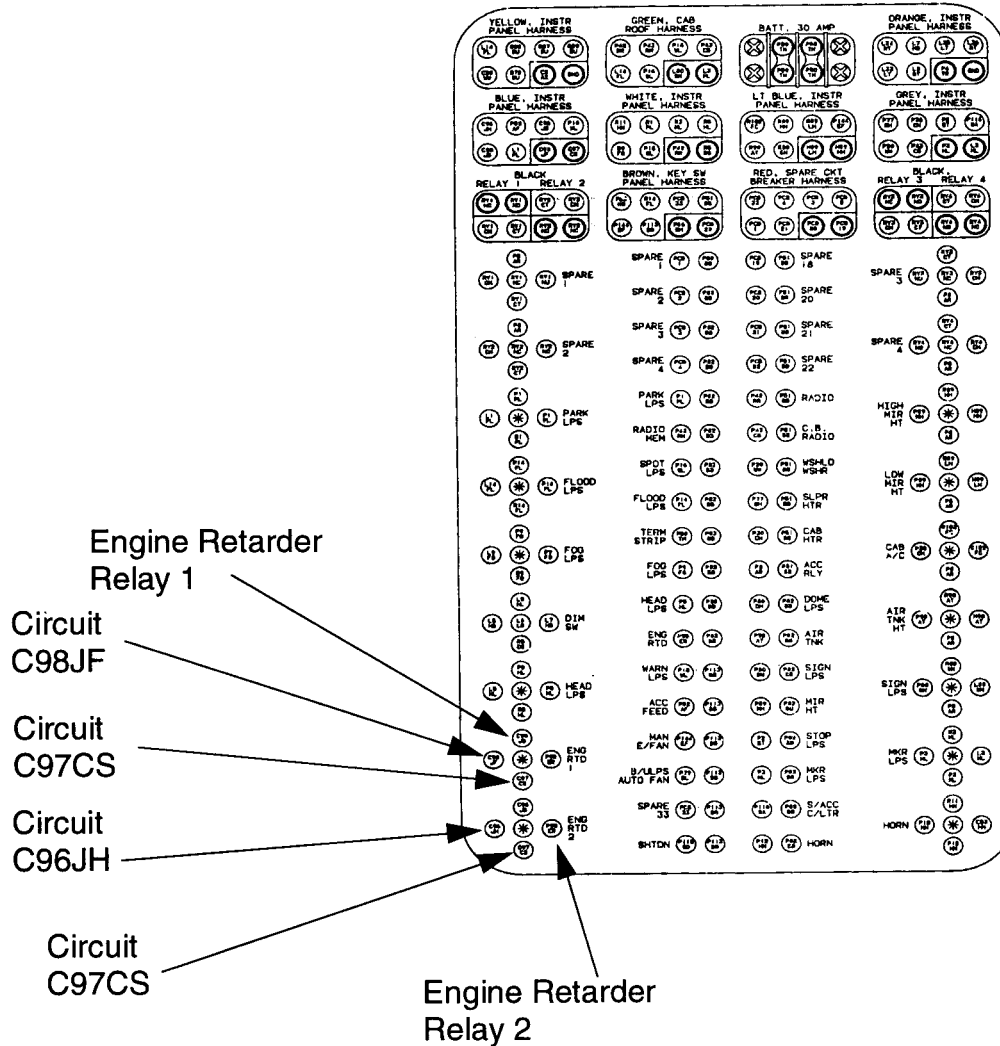


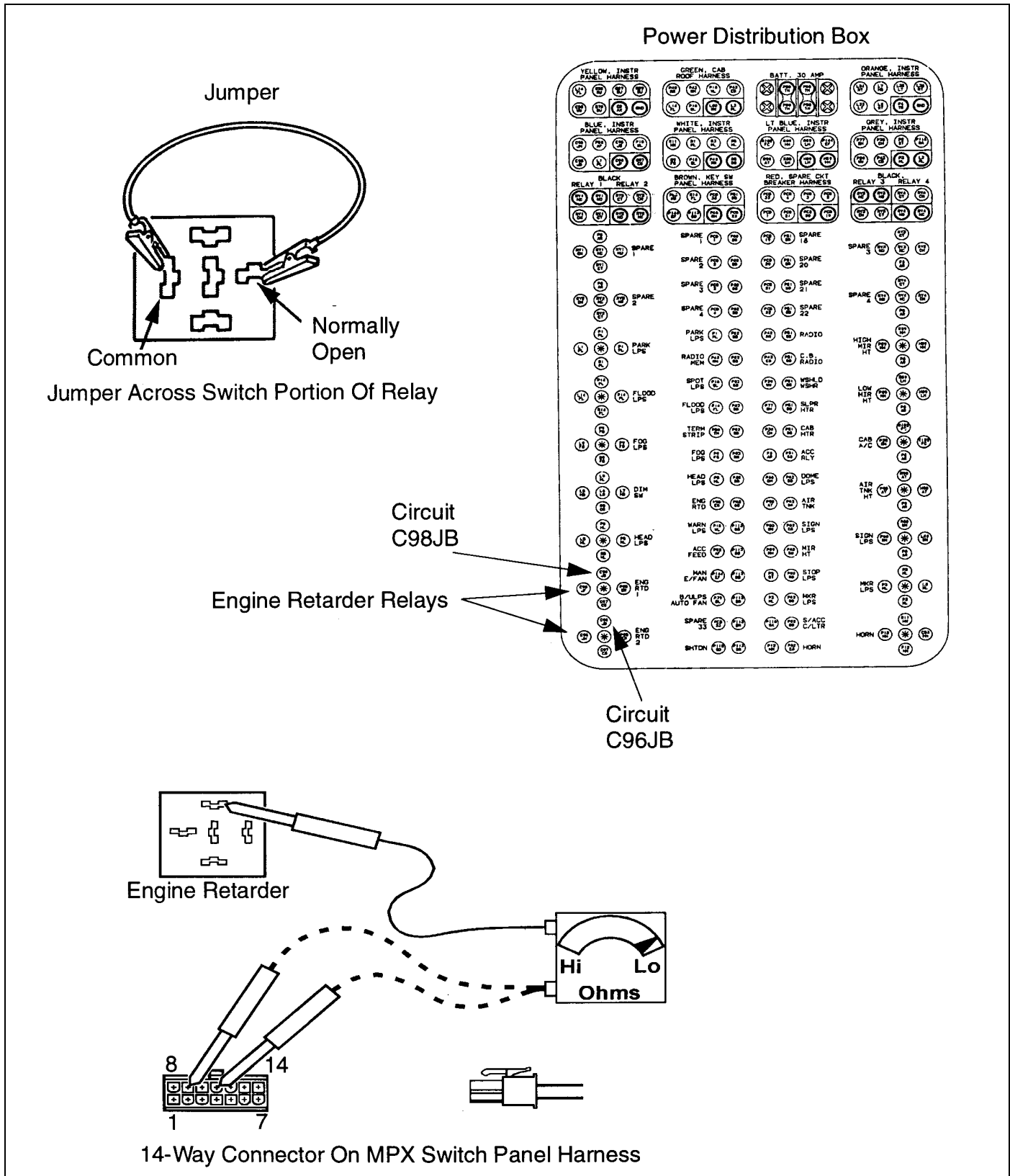
Figure 16-8

Kenworth SmartWheel Troubleshooting Guide**16****C. Engine Retarder Does Not Work****C1. Symptom: Engine retarder will not turn on (1994 Cummins only).****C1-1. Possible cause: No power or ground to retarder circuit.**

Check	Result	What To Do Next
C1-1A Engine retarder (ENG RTD) circuit breaker or fuse in cab power distribution box.	Circuit breaker or fuse OK. No continuity.	Go to C1-1B . Determine cause for fuse to blow (shorted wire, etc.). Replace circuit breaker or fuse. If retarder still does not work, go to C1-1B .
C1-1B Continuity in ground circuit for retarder relays (ckt C97CS) from relay coil to cab ground.	Connector OK, continuity to cab ground. Connection loose, broken, corroded.	Go to C1-2 . Repair or replace connector(s), tighten ground stud.

C1-2. Possible cause: Problem in retarder circuits C96JH or C98JF.

Check	Result	What To Do Next
C1-2A Retarder wiring/ connections leading to engine brake solenoids (ckts C96JH and C98JF). Use multi-plex steering wheel Select engine wiring diagram.	Wires OK, connectors clean and tight. Wires broken, frayed, or connectors loose, damaged, corroded.	Go to C1-3 . Repair or replace wires and/or connectors.

Kenworth SmartWheel Troubleshooting Guide**16****Figure 16-9**

Kenworth SmartWheel Troubleshooting Guide**16****C. Engine Retarder Does Not Work****C1-3. Possible cause: Bad retarder relay(s) in power distribution box.**

Check	Result	What To Do Next
C 1-3A Turn on ignition. Press the retarder buttons on steering wheel. Listen for relay clicks in power distribution box.	Click heard.	Determine which relay was clicking. Remove this relay. Use jumper wire from terminal marked + to terminal directly across from it (common to normally open). This retarder setting should now work. If it does, replace relay. Repeat for other relay if it also clicked. If retarder settings do not work with jumper in place, Go to C1-4 .
	No click heard.	Go to C1-4 .

C1-4. Possible cause: Problem in circuits C96JB or C98JB.

Check	Result	What To Do Next
C1-4A Unplug the 14 way connector from the multiplex module. Check continuity of ckts C98JB and C96JB from pins 9 and 11 of the connector to top terminal (coil-power side) of each retarder relay position in power distribution box.	Ckt has continuity. No continuity.	Go to C2 . There is a break in the circuit between the module and the power distribution box. Trace each circuit, checking connectors and wiring.

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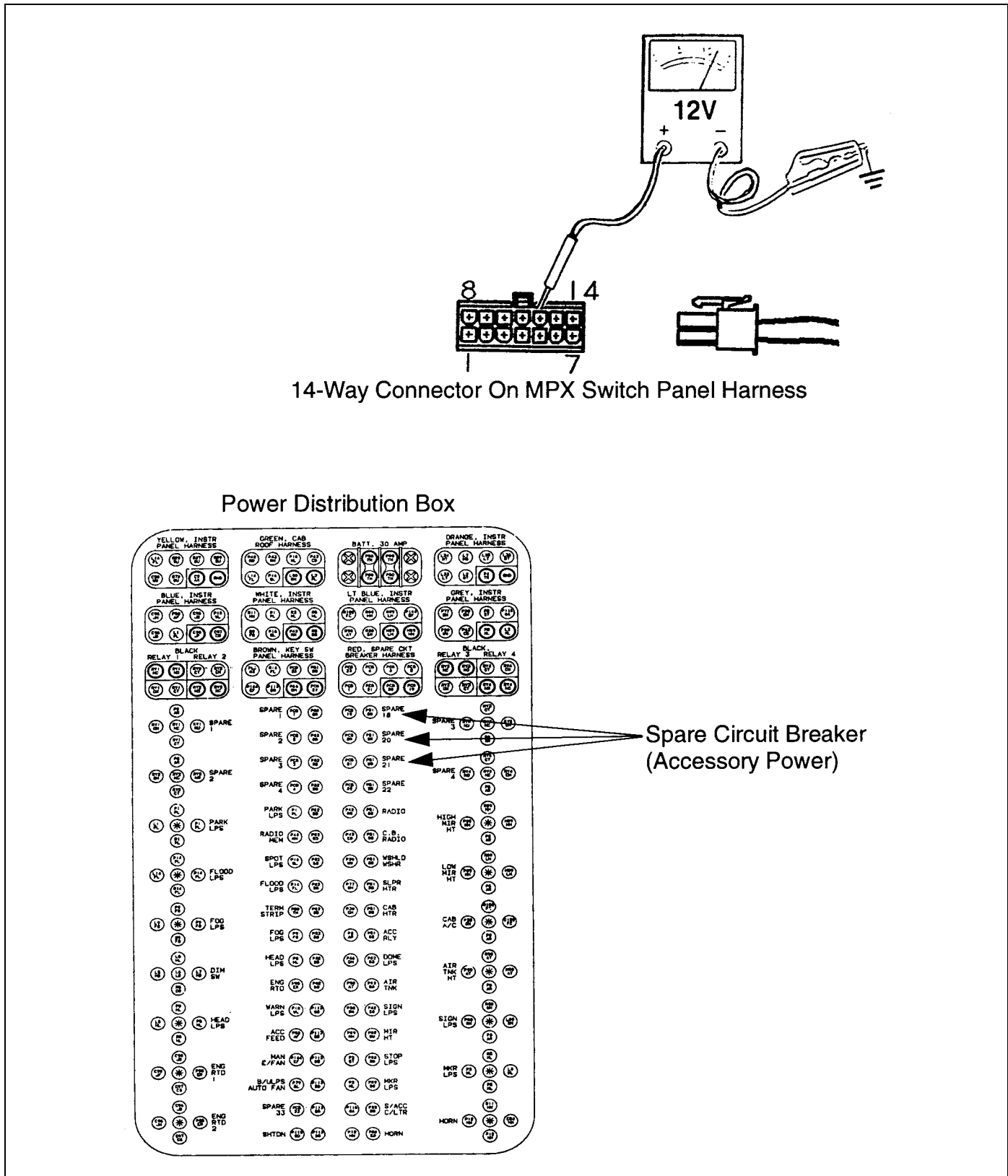


Figure 16-10

Kenworth SmartWheel Troubleshooting Guide**16****C. Engine Retarder Does Not Work**

NOTE: Use this section only if retarder does not work. If none of the SmartWheel functions work, go to Section A.

C2. Symptom: Engine retarder will not turn on (all engines).**C2-1. Possible cause: No accessory power to electronics module.**

Check	Result	What To Do Next
C2-1A Unplug 14-way connector from electronics module. Turn on ignition. Check voltage between connector pin 12 and a cab ground.	Voltmeter reads battery voltage. No voltage. Go to C2-1 B.	Go to C2-2 . Go to C2-1B .
C2-1B Check circuit breaker or fuse in power distribution box position Spare 19, 20, or 21.	Circuit breaker/fuse OK. Circuit breaker bad/fuse	An open circuit exists between the power dist box & the electronics module. Trace circuits PCB 19, 20, 21. Replace circuit breaker or blown fuse. Determine cause for fuse to blow.

C2-2. Possible cause: Problem in retarder wiring.

Check	Result	What To Do Next
2-2A Check retarder circuits between electronics module 14-way connector pins 9,11, 14 and engine ECM. DDEC: 953, 979, 583. CAT: C993, E716, E717. Cummins: 588, C96JH, C98JF.	Wiring, connectors OK all circuits have continuity. Wire broken, connector unplugged, loose or corroded.	Go to C3-2 . Repair or replace wires and/or connectors.

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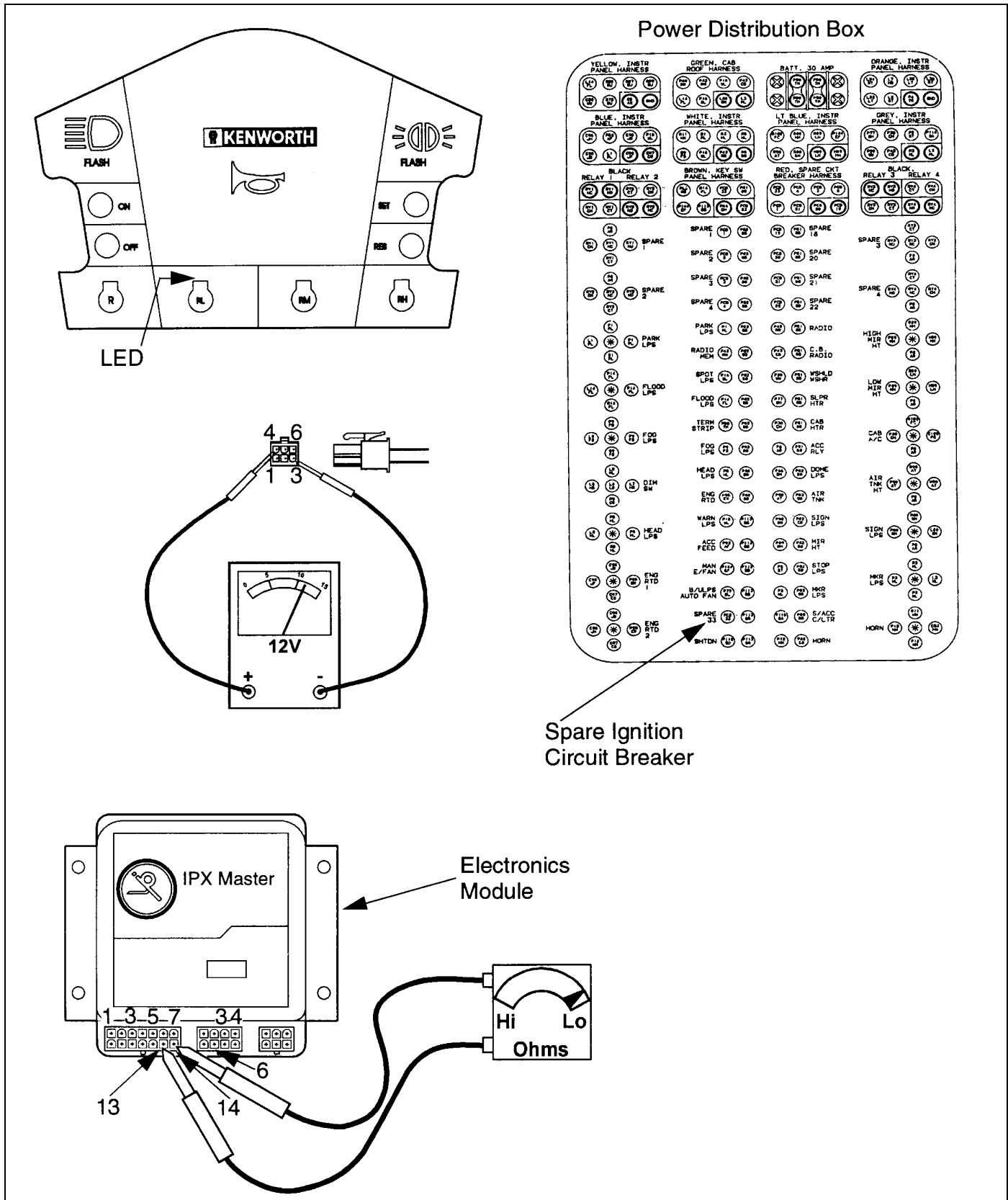


Figure 16-11

Kenworth SmartWheel Troubleshooting Guide**16****C. Engine Retarder Does Not Work****C3. Symptom: Retarder works only when button held down or does not turn on.****C3-1. Possible cause: No ignition power to electronics module.**

Check	Result	What To Do Next
C3-1A Turn on ignition. Push any one of the engine brake switches. Check if LED over that switch is on.	LED on. LED lights only when button held down. LED does not turn on.	Go to C3-2 . Go to C3-1B . Go to C3-2 .
C3-1B Unplug 6-way connector from electronics module. Check voltage between connector pins 4 and 3 with ignition on.	Voltmeter reads battery voltage. No voltage.	Go to C3-2. Go to C3-1C .
C3-1 C Check circuit breaker or fuse in power distribution box position Spare 33.	Circuit breaker/fuse OK. Circuit breaker bad/fuse blown.	There is an open circuit from the power distribution box to electronics module. Trace ckt PCB 33. Replace circuit breaker or fuse. Determine cause for fuse to blow.

C3-2. Possible cause: Bad electronics module or steering wheel hub.

Check	Result	What To Do Next
C3-2A Check for continuity between pins 13 and 14 of the 14 way connector on the electronics module (with any retarder setting turned on).	Continuity. No continuity.	Problem must be in retarder wiring or engine ECM. Retrace retarder circuits. Problem may be in electronics module or steering wheel hub. Go to A3.

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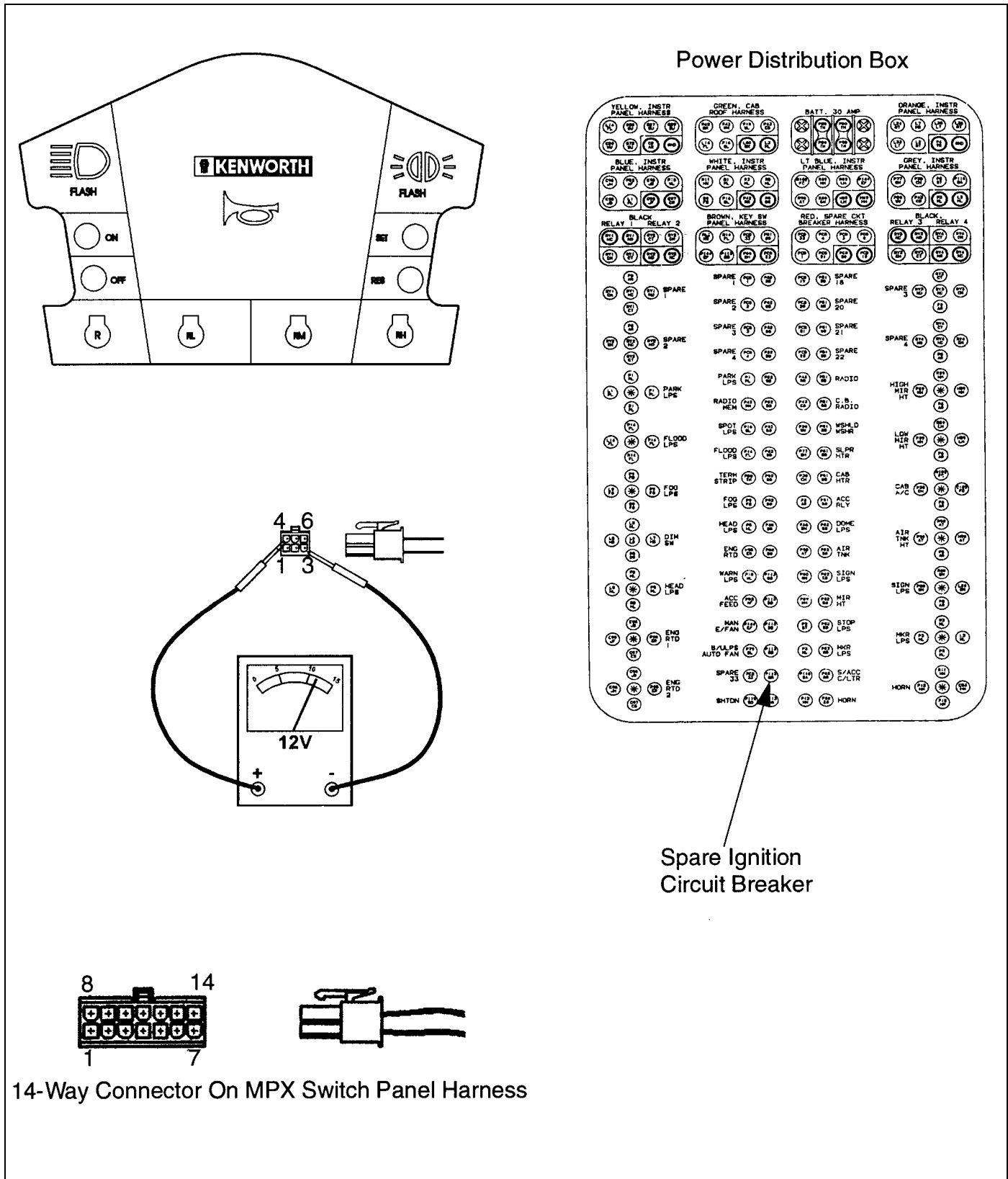


Figure 16-12

Kenworth SmartWheel Troubleshooting Guide**16****D. Cruise Control Does Not Work****D1. Symptom: Cruise Control will not turn on.****D1-1. Possible cause: No ignition power to electronics module.**

Check	Result	What To Do Next
D1 -1 A Turn on ignition. Push and release cruise control On switch. Check if LED over switch is on.	LED on. LED on only when button held down. LED does not turn on.	Go to D1-2 . Go to D1-1B . Go to A1 .
D1-1 B Unplug 6-way connector from electronics module. Check voltage between connector pins 4 and 3 with ignition on.	Voltmeter reads battery voltage. No voltage.	Go to A3 . Go to D1-1C .
D1 -1 C Check circuit breaker or fuse in power distribution box position Spare 33.	Circuit breaker/fuse OK. Circuit breaker bad/fuse blown.	There is an open circuit from the power distribution box to electronics module. Trace circuit PCB 33. Replace ckt breaker or fuse. Determine cause for fuse to blow.

D1-2. Possible cause: Problem in cruise control wiring.

Check	Result	What To Do Next
D1 -2A Check cruise ckt between pin 14 of 14-way connector at electronics module and engine ECM. DDEC: Ckt 953, CAT: Ckt C993, Cummins: Ckt 588. Also check jumper (pin 10 to 13)	Wiring, connectors OK all circuits have continuity. Wire broken, connector unplugged, loose or corroded.	Go to D1-3. Repair or replace wires and/or connectors.

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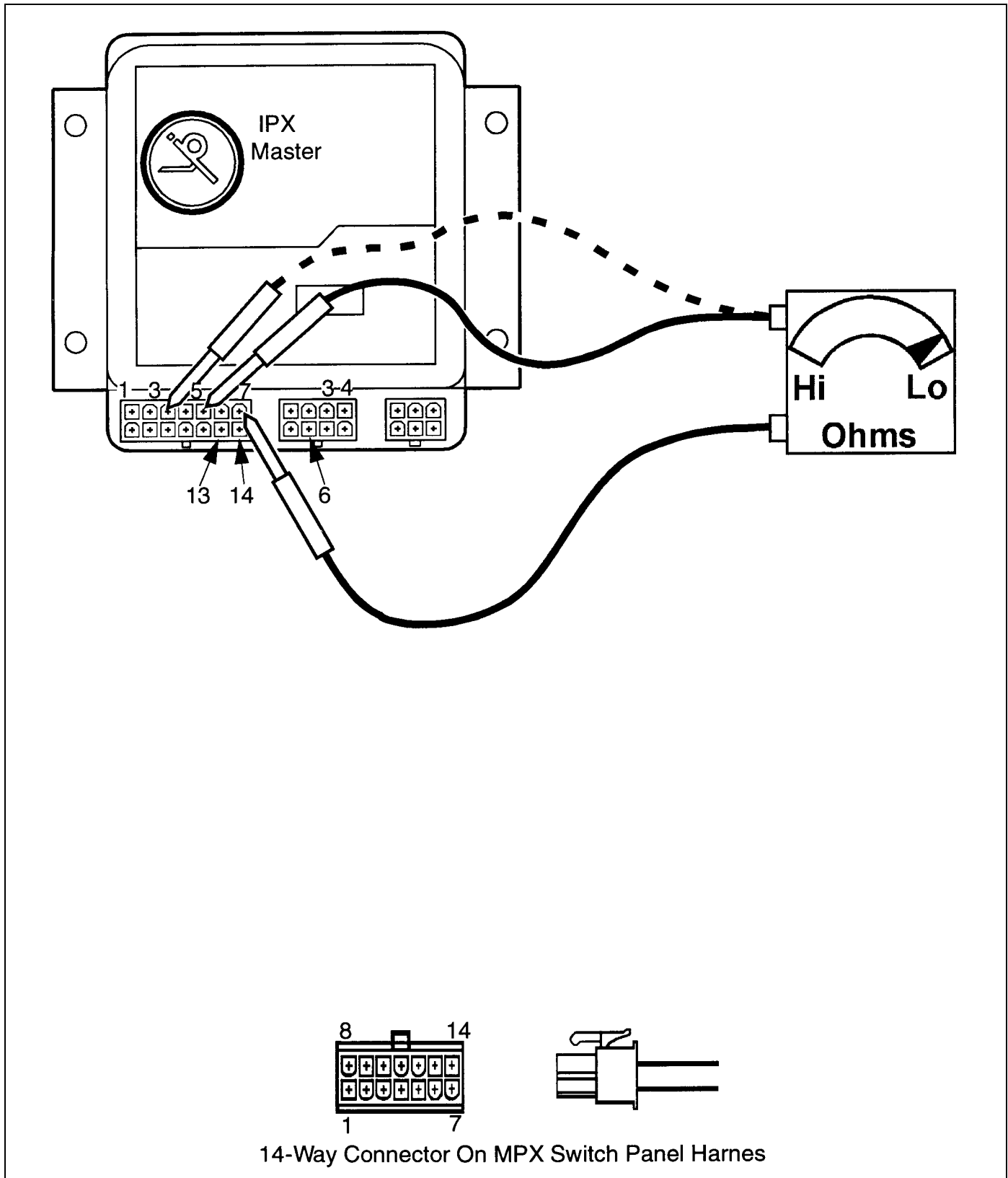


Figure 16-13

Kenworth SmartWheel Troubleshooting Guide**16****D. Cruise Control Does Not Work****D1-3. Possible cause: Bad electronics module or steering wheel hub.**

Check	Result	What To Do Next
D 1-3A Unplug 1 4-way connector from electronics module. Turn on ignition. Activate cruise control by pushing "on" button on steering wheel. Check for continuity between pins 5 & 7 on module.	Continuity after "On" button is pushed. No continuity after "Off" button is pushed. No continuity after "On" button is pushed.	Problem is not in multiplex steering wheel system. Check all wiring and connectors again. Problem could be in electronics module or steering wheel hub. Go to A3 .

D2. Symptom: Cruise SET will not work.**D2-1. Possible cause: Problem in cruise control wiring.**

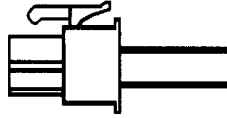
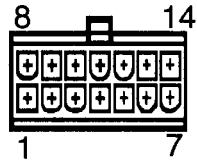
Check	Result	What To Do Next
D2-1A Check cruise set circuit between pin 3 of 14-way connector at electronics module and engine ECM. DDEC: Ckt 541 CAT: Ckt C978 Cummins: Ckt 553.	Wiring, connectors OK all circuits have continuity. Wire broken, connector unplugged, loose or corroded.	Go to D2-2 . Repair or replace wires and/or connectors.

D2-2. Possible cause: Bad electronics module (assumes cruise turns on).

Check	Result	What To Do Next
D2-2A Unplug 14-way connector from electronics module. Turn on ignition. Activate cruise control by pushing "on" button on steering wheel. Check for continuity between pins 3 & 7 on module when "set" button is pushed.	Continuity when "Set" button is pushed. No continuity when "Set" button is pushed.	Problem is not in multiplex steering wheel system. Check all wiring and connectors again. Problem could be in electronics module or steering wheel hub. Go to A3 .

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14-Way Connector On MPX Switch Panel Harness

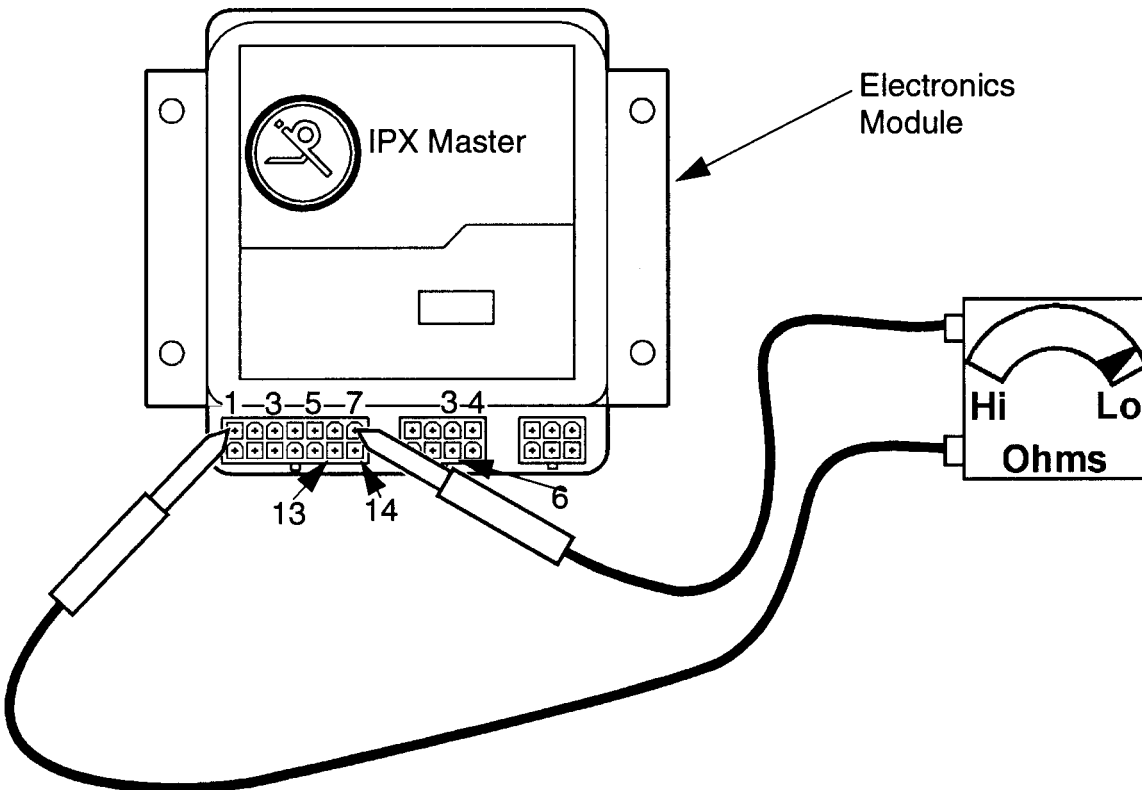


Figure 16-14

Kenworth SmartWheel Troubleshooting Guide**16****D. Cruise Control Does Not Work****D3. Symptom: Cruise RESUME will not work.****D3-1. Possible cause: Problem in cruise control wiring.**

Check	Result	What To Do Next
D3-1A Check cruise res circuit between pin 1 of 14-way connector at electronics module and engine ECM. DDEC: Ckt 545 CAT: Ckt C979 Cummins: Ckt 523	Wiring, connectors OK all circuits have continuity. Wire broken, connector unplugged, loose or corroded.	Go to D3-2 . Repair or replace wires and/or connectors.

D3-2. Possible cause: Bad electronics module (assumes cruise turns on).

Check	Result	What To Do Next
D3-2A Unplug 14-way connector from electronics module. Turn on ignition. Activate cruise control by pushing "on" button on steering wheel. Check for continuity between pins 1 & 7 on module when "res" button is pushed.	Continuity when "Res" button is pushed. No continuity when "Res" button is pushed.	Problem is not in multiplex steering wheel system. Check all wiring and connectors again. Problem could be in electronics module or steering wheel hub. Go to A3 .

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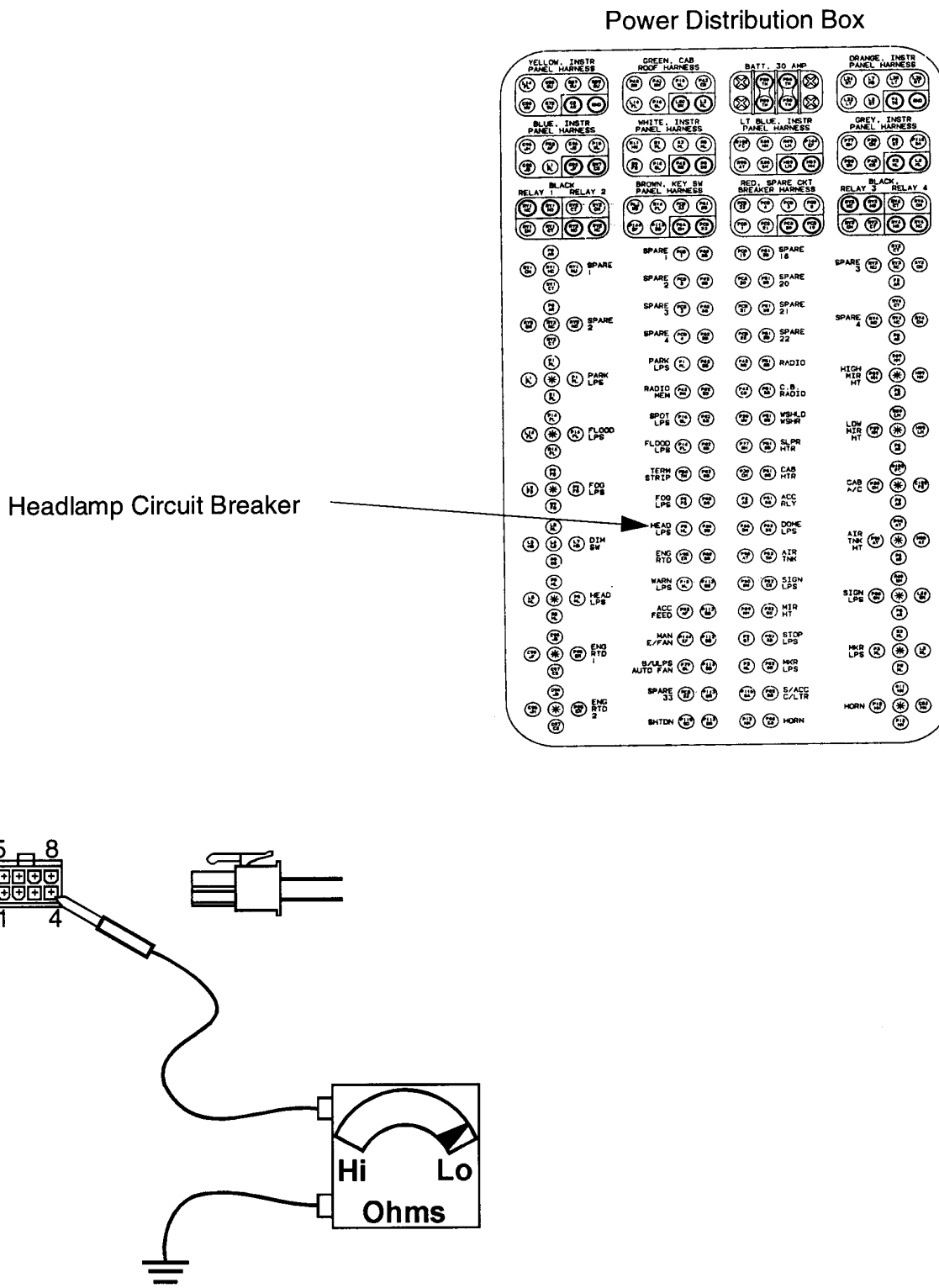


Figure 16-15

Kenworth SmartWheel Troubleshooting Guide**16****E. Headlight Flash Does Not Work**

NOTE: Use this section only if headlights or headlight flash does not work. If none of the Smart Wheel functions work, go to Section A.

E1. Symptom: Headlights do not turn on.**E1-1. Possible cause: No power or ground in headlight circuit.**

Check	Result	What To Do Next
E1-1A Headlamp circuit breaker or fuse in cab power distribution box (HEAD LPS).	Circuit breaker or fuse OK. No continuity.	Go to E1-1B . Determine cause for fuse to blow (shorted wire, etc.). Replace circuit breaker or fuse. If headlamps still do not turn on, go to E1-1B .
E1 -1 B Ground circuit of headlamp harness in engine area.	Connection tight, ground circuit OK. Connection loose, wires frayed or broken.	Go to E1-1C . Repair or replace wires and/or connectors.
E1 -1 C Unplug 8-way connector from electronics module. Check for continuity from pin 4 on harness connector to ground.	Continuity to cab ground. No continuity.	Go to E1-2 . Trace ground circuit from module to cab ground.

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8-Way Connector On MPX Switch Panel Harness

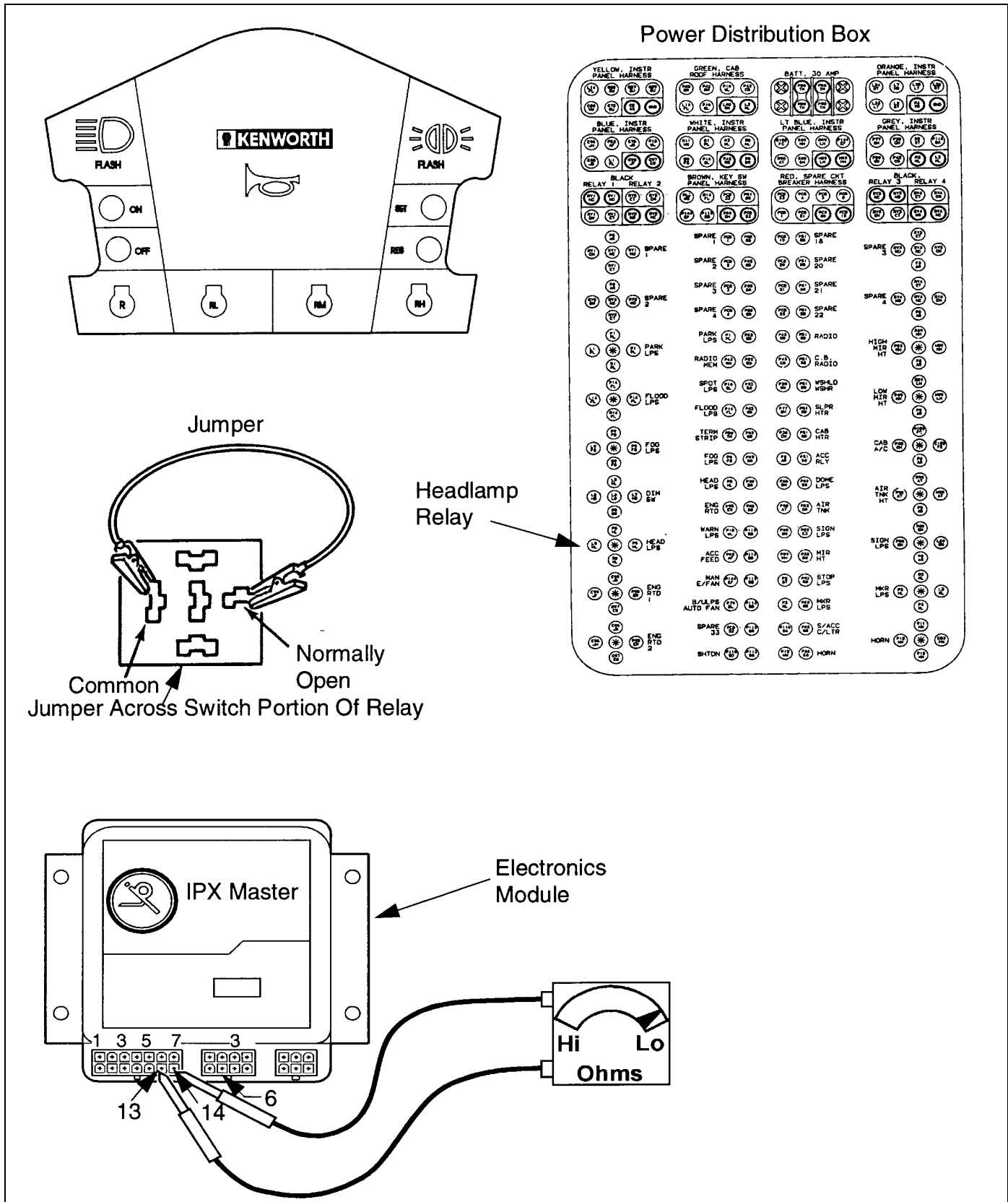
Figure 16-16

Kenworth SmartWheel Troubleshooting Guide**16****E. Headlight Flash Does Not Work****E1. Symptom: Headlights do not turn on.****E 1-2. Possible cause: Problem in headlight circuits.**

Check	Result	What To Do Next
E1 -2A Headlamp wiring/ connections in engine area leading to headlights (ckt L6LB).	Wires/connectors OK. Wires frayed, broken, connectors loose or unplugged.	Go to E1-2B . Repair/replace wires or connectors.
E1 -2B Continuity of ckt R5NC from dash switch to electronics module (8-way connector pin 6), and ckt R5HL from dash switch to power distribution box.	Circuit has continuity. No continuity.	Go to E1-3 . Trace circuits, check for broken wire or bad connections.

E1-3. Possible cause: Bad dash switch.

Check	Result	What To Do Next
E1 -3A Unplug headlamp dash switch. Check continuity from switch terminal R5HL to R5NC when switch is turned on.	Ohmmeter reads continuity when switch is turned on. No continuity when switch is on.	Go to E1-4 . Replace switch.

Kenworth SmartWheel Troubleshooting Guide**16****Figure 16-17**

Kenworth SmartWheel Troubleshooting Guide**16****E. Headlight Flash Does Not Work****E1. Symptom: Headlights will not turn on****E1-4. Possible cause: Bad headlamps relay in power distribution box.**

Check	Result	What To Do Next
E 1 -4A Turn on ignition. Turn on headlights with dash switch. Press headlight flash button on steering wheel. Listen for relay click in power distribution box.	Click heard.	Remove headlamp relay. Use jumper wire from terminal marked + to terminal directly across from it (not S terminal) (common to normally open). Headlights should come on. If headlights work, replace relay. If headlights do not work, the problem exists in truck wiring.
	No click heard.	Go to E1-5 .

E1-5. Possible cause: Bad electronics module.

Check	Result	What To Do Next
E 1 -5A Turn off ignition. Unplug 8-way connector from electronics module. Check for continuity between pins 4 & 6 on module connector.	Continuity from pin 4 to 6.	Problem may be in wiring. Check headlamp circuits again. Go to A3 .
	No continuity.	Replace electronics module.

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8-Way Connector On MPX Switch Panel Harness

Figure 16-18

Kenworth SmartWheel Troubleshooting Guide**16****E. Headlight Flash Does Not Work****E2. Symptom: Headlights do not flash on with SmartWheel switch.****E2-1. Possible cause: Problem in circuit R5NO.**

Check	Result	What To Do Next
E2-1A Unplug the 8 way connector from the electronics module. Check continuity of ckt R5NO from pin 5 of the connector to dash head-lamp switch.	Ckt has continuity. No continuity.	Go to E1-1 . There is a break in the circuit between the module and the dash switch. Trace ckt R5NO.

E3. Symptom: Headlights do not blink off with SmartWheel switch.**E3-1. Possible cause: Problem with multiplex control system.**

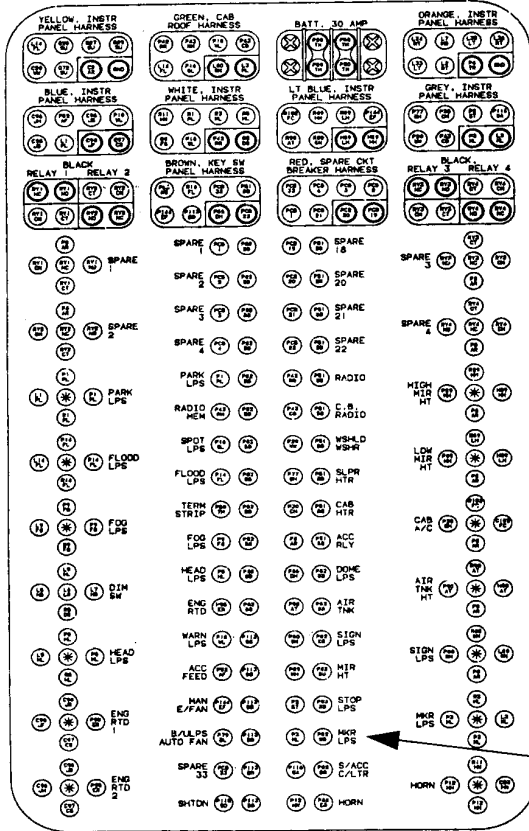
Check	Result	What To Do Next
E3-1A Press Smartwheel head-lamp flash switch. Listen for relay click in power distribution box.	Click heard. No click.	Headlamp relay may be faulty. Go to E1-4 . Go to A1.

NOTE: If vehicle is equipped with Daytime Running Lights, the headlights will not blink off completely with the SmartWheel. They will change to their daytime mode when the headlamp flash button is pressed.

Kenworth SmartWheel Troubleshooting Guide

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Power Distribution Box



Marker Lamps
Circuit Breaker

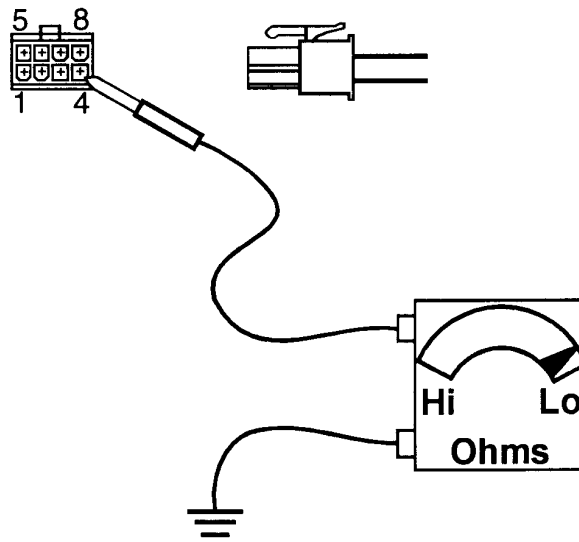


Figure 16-19

Kenworth SmartWheel Troubleshooting Guide**16****F. Marker Lamp Flash Does Not Work**

NOTE: Use this section only if marker lights or marker light flash does not work. If none of the SmartWheel functions work, go to Section A.

F1. Symptom: Marker lights do not turn on.**F1-1. Possible cause: No power or ground in marker light circuit.**

Check	Result	What To Do Next
F1-1A Marker lamp circuit breaker or fuse in cab power distribution box (MKR LPS).	Circuit breaker or fuse OK. No continuity.	Go to F1-1B . Determine cause for fuse to blow (shorted wire, etc.). Replace circuit breaker or fuse. If marker lamps still do not turn on, go to F1-1B .
F1-1B Ground circuit of trailer cable to cab ground or cab roof harness (for cab marker lights).	Connection tight, ground circuit OK. Connection loose, wires frayed or broken.	Go to F1-1C . Repair or replace wires and/or connectors.
F1-1C Unplug 8-way connector from electronics module. Check for continuity from pin 4 on harness connector to ground.	Continuity to cab ground. No continuity.	Go to F1-2 . Trace ground circuit from module to cab ground.

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8-Way Connector On MPX Switch Panel Harness

Figure 16-20

Kenworth SmartWheel Troubleshooting Guide**16****F. Marker Lamp Flash Does Not Work****F1. Symptom: Marker lights do not turn on****F1-2. Possible cause: Problem in marker light circuits.**

Check	Result	What To Do Next
F1 -2A Marker lamp wiring/ connections leading to marker lights (ckt L3ML) from power distribution box through trailer cable.	Wires/connectors OK. Wires frayed, broken, connectors loose or unplugged.	Go to F1-2B . Repair/replace wires or connectors.
F1 -2B Continuity of ckt R3NC from dash switch to electronics module (8-way connector pin 3), and ckt R3ML from dash switch to power distribution box.	Circuit has continuity. No continuity.	Go to F1-3 . Trace circuits, check for broken wire or bad connections.

F1-3. Possible cause: Bad dash switch.

Check	Result	What To Do Next
F1 -3A Unplug marker lamp dash switch. Check continuity from switch terminal R3ML to R3NC when switch is turned on.	Ohmmeter reads continuity when switch is turned on. No continuity when switch is on.	Go to F1-4 . Replace switch.

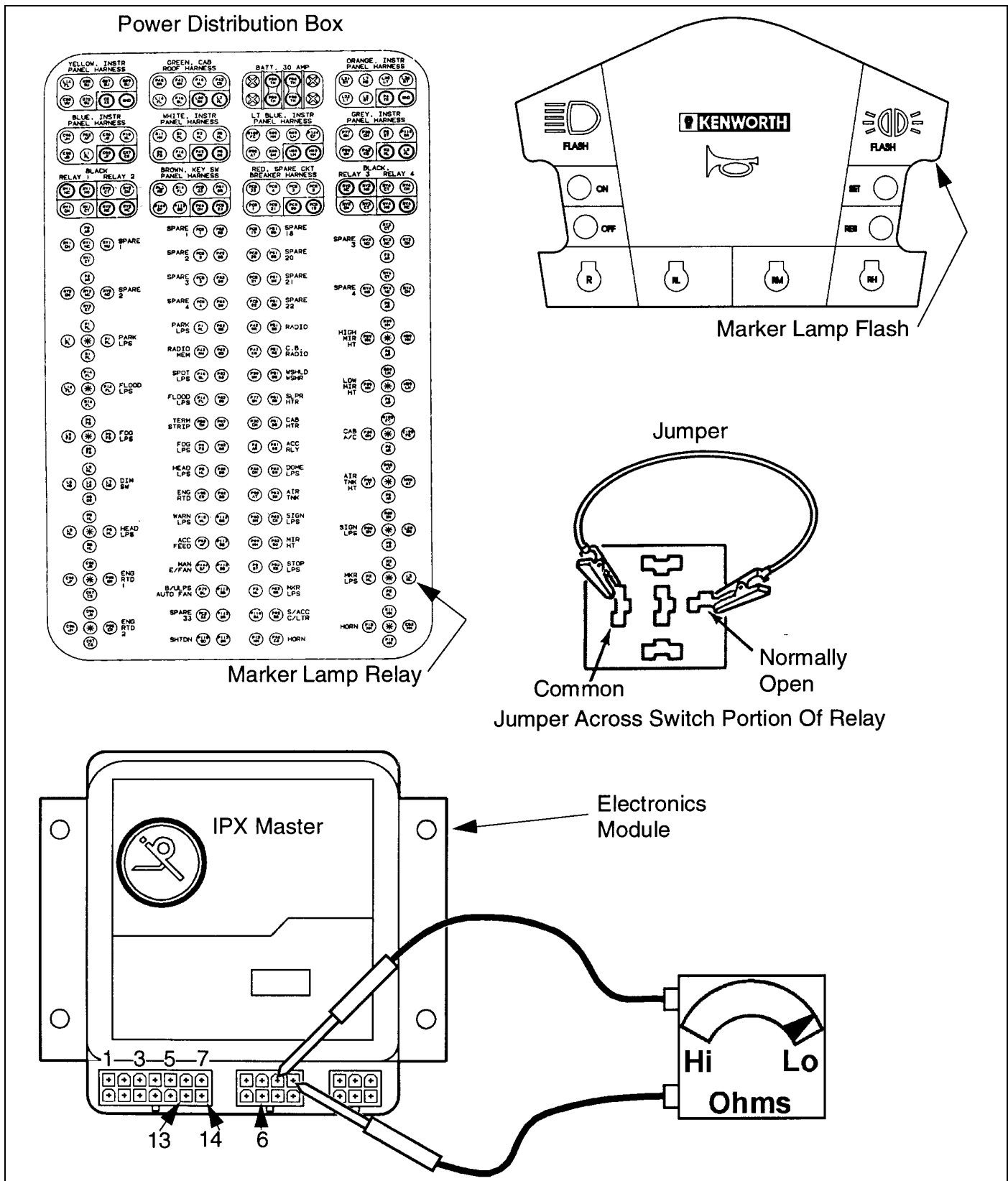
Kenworth SmartWheel Troubleshooting Guide**16**

Figure 16-21

Kenworth SmartWheel Troubleshooting Guide**16****F. Marker Lamp Flash Does Not Work****F1. Symptom: Marker lights will not turn on****F1-4. Possible cause: Bad marker lamps relay in power distribution box.**

Check	Result	What To Do Next
F1 -4A Press marker lamp flash button on steering wheel. Listen for relay click in power distribution box.	Click heard.	Remove marker lamp relay. Use jumper wire from terminal marked + to terminal directly across from it (not S terminal) (common to normally open). Marker lights should come on. If marker lights work, replace relay. If marker lights do not work, the problem exists in truck wiring.
	No click heard.	Go to F1-5 .

F1-5. Possible cause: Bad electronics module.

Check	Result	What To Do Next
1 -5A Turn off ignition. Unplug 8-way connector from electronics module. Check for continuity between pins 3 & 4 on module connector.	Continuity from pin 3 to 4.	Problem may be in wiring. Check marker lamp circuits again. Go to A3 .
	No continuity.	Replace electronics module.

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8-Way Connector On MPX Switch Panel Harness

Figure 16-22

Kenworth SmartWheel Troubleshooting Guide**16****F. Marker Lamp Flash Does Not Work****F2. Symptom: Marker lights do not flash on with SmartWheel switch.****F2-1. Possible cause: Problem in circuit R3NO.**

Check	Result	What To Do Next
F2-1A Unplug the 8 way connector from the electronics module. Check continuity of ckt R3NO from pin 2 of the connector to dash marker lamp switch.	Ckt has continuity. No continuity.	Go to F1 . There is a break in the circuit between the module and the dash switch. Trace ckt R3NO.

F3. Symptom: Marker lights do not blink off with Smart**F3-1. Possible cause: Problem with multiplex control system.**

F3-1A Press Smartwheel marker lamp flash switch. Listen for relay click in power distribution box.	Click heard.	Marker lamp relay may be faulty. Go to F1-4.
	No click.	Go to A1.

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